

WHAT IS CLAIMED IS:

1. A method of forming a textured metal structure comprising the steps of:
forming a textured structure comprised of substantially silicon atoms;
and
replacing silicon atoms in the textured structure with metal atoms.
- 5 2. The method of Claim 1, wherein the step of forming a textured structure comprises:
depositing an amorphous or polycrystalline silicon structure by chemical vapor deposition; and
10 annealing the silicon structure to form a silicon surface having a textured surface morphology.
- 15 3. The method of Claim 1, wherein the step of replacing silicon atoms with metal atoms comprises exposing the textured structure to a refractory metal-halide complex.
4. The method of Claim 3, wherein the refractor metal-halide complex comprises WF_6 .
- 20 5. The method of Claim 4, further comprising the step of chemically oxidizing the textured structure prior to exposing the textured structure to the refractory metal-halide complex.
- 25 6. A process for fabricating a metal-insulator-metal capacitor on a semiconductor wafer comprising the steps of:
forming a silicon electrode structure on the semiconductor wafer;
texturizing the silicon electrode structure; and
replacing the silicon in the silicon electrode structure with a metal,
thereby forming a textured metal electrode.
7. The process of Claim 6, further comprising covering the textured metal electrode with a dielectric layer having a high dielectric constant.
8. The process of Claim 7, further comprising covering the dielectric layer with a metal layer.
- 30 9. The process of Claim 6, wherein the step of replacing the silicon in the silicon electrode structure comprises exposing the silicon electrode structure to a

refractory metal-halide complex.

10. The process of Claim 9, wherein the refractory metal-halide complex comprises WF₆.

5 11. The process of Claim 7, wherein the dielectric layer comprises a material selected from the group consisting of Ta₂O₅, BaTiO₃, SrTiO₃, Ba_xSr_{1-x}TiO₃, and PbZr_xTi_{1-x}O₃.

12. The process of Claim 8, wherein the metal layer comprises titanium.

13. A DRAM capacitor comprising:

a metal electrode having a textured surface morphology;
10 a dielectric layer superjacent to the metal electrode; and
a conductive layer superjacent to the dielectric layer.

14. The DRAM capacitor of Claim 13, wherein the metal electrode is comprised of substantially a refractory metal.

15 15. The DRAM capacitor of Claim 14, wherein the refractory metal is tungsten.

16. The DRAM capacitor of Claim 13, wherein the dielectric layer is comprised of a material selected from the group consisting of Ta₂O₅, BaTiO₃, SrTiO₃, Ba_xSr_{1-x}TiO₃, and PbZr_xTi_{1-x}O₃.

20 17. The DRAM capacitor of Claim 13, wherein the conductive layer comprises a refractory metal.

18. The DRAM capacitor of Claim 17, wherein the refractory metal is titanium.

25 19. A capacitor within an integrated circuit comprising:

a metal electrode having a textured surface;
a dielectric layer covering said textured surface; and
a second electrode covering said dielectric layer.

20. A method of forming an integrated circuit capacitor comprising:

forming a metal electrode having a textured surface;
covering said textured surface with a dielectric; and
covering said dielectric with a second electrode.